

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: M. Hayama et al. : Art Unit:  
 Serial No.: To Be Assigned : Examiner:  
 Filed: Herewith :  
 For: METHOD FOR FABRICATING A :  
 MULTILAYER CERAMIC  
 SUBSTRATE (AS AMENDED)

## DIVISIONAL OF:

Applicant: M. Hayama et al. : Art Unit: 2814  
 Serial No.: 09/173,288 : Examiner: A. Chambliss  
 Filed: October 14, 1998 : Attn: Issue Branch  
 For: METHOD FOR FABRICATING A : Confirmation No.: 1587  
 MULTILAYER CERAMIC :  
 SUBSTRATE (AS AMENDED) :

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
 Washington, DC 20231

S I R :

Prior to examination, please amend the above-identified application as follows:

IN THE TITLE:

Please replace the Title beginning at page 1, line 1 of the Specification:

METHOD FOR FABRICATING A MULTILAYER CERAMIC SUBSTRATE

IN THE SPECIFICATION:

Please insert the following section at page 1, line 5 of the Specification:

**CROSS-RELATED APPLICATIONS**

This application is a Divisional application of U.S. Patent Application Serial No. 09/173,288, filed October 14, 1998.

IN THE DRAWINGS:

Please delete sheets "5/13", "6/13", and "7/13" and replace with the figures attached hereto.

IN THE CLAIMS:

Please cancel claims 1, 2, and 4-21.

Please replace claim 3 with the following amended claim:

1           3. (As Amended) A method for fabricating a multilayer ceramic substrate  
2 comprising the steps of:

3           (a) manufacturing an intaglio plate of flexible resin substance, on which a  
4 first groove corresponding to a first conductive pattern is formed and a second  
5 groove having a depth deeper than that of the first groove is formed at a place  
6 corresponding to a via of the first conductive pattern;

7           (b) filling the first and the second grooves with an electroconductive paste;

8           (c) increasing conductivity of respective paths in said first and second  
9 grooves by deaerating and drying the paste;

10          (d) adding additional electroconductive paste to said first and second  
11 grooves to replenish a decremented volume of said paste ;

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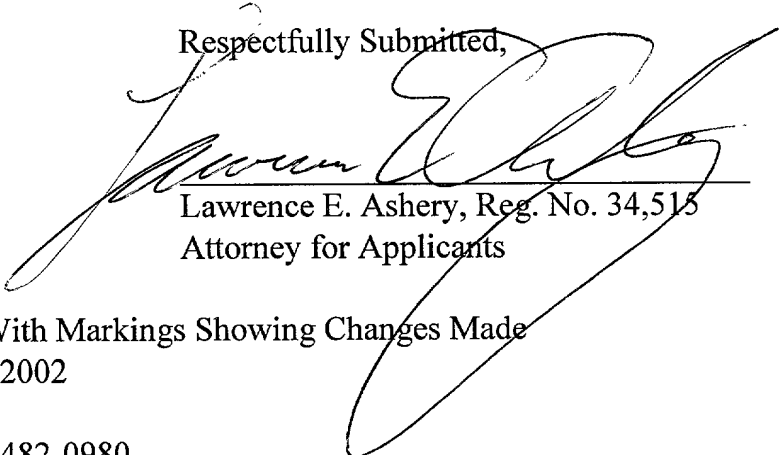
(e) gluing said intaglio plate onto a ceramic substrate by applying heat and pressure;

(f) separating said intaglio plate from said ceramic substrate to have a pattern of the electroconductive paste transferred onto the ceramic substrate, and burning it so as to form said first conductive pattern on the ceramic substrate;

(g) forming an insulation layer on said first conductive pattern, wherein said insulation layer is formed by a printing technology covering the whole area of said first conductive pattern and is dried, said via is exposed through abrasion or grinding of the dried insulation layer and said insulation layer is burned after the exposure of said via;

(h) forming a second conductive pattern on said insulation layer.

Respectfully Submitted,

  
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Attorney for Applicants

LEA/lm

Enclosure: Version With Markings Showing Changes Made

Dated: February 20, 2002

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The Assistant Commissioner for Patents is hereby authorized to charge payment to Deposit Account No. 18-0350 of any fees associated with this communication.

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I hereby certify that this paper and fee are being deposited, under 37 C.F.R. § 1.10 and with sufficient postage, using the "Express Mail Post Office to Addressee" service of the United States Postal Service on the date indicated above and that the deposit is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.



Kathleen Libby

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

TITLE:

Specification at page 1, line 1:

# MULTILAYER CERAMIC SUBSTRATE AND METHOD FOR FABRICATING THE SAME

**SPECIFICATION:**

Specification at page 1, line 5:

## CROSS-RELATED APPLICATIONS

This application is a Divisional application of U.S. Patent Application  
Serial No. 09/173,288, filed October 14, 1998.

CLAIMS:

3. (As Amended) ~~The method for fabricating a multilayer ceramic substrate recited in claim 1,~~ A method for fabricating a multilayer ceramic substrate comprising the steps of:

(a) manufacturing an intaglio plate of flexible resin substance, on which a first groove corresponding to a first conductive pattern is formed and a second groove having a depth deeper than that of the first groove is formed at a place corresponding to a via of the first conductive pattern;

(b) filling the first and the second grooves with an electroconductive paste;

(c) increasing conductivity of respective paths in said first and second grooves by deaerating and drying the paste;

11 (d) adding additional electroconductive paste to said first and second  
12 grooves to replenish a decremented volume of said paste ;

13 (e) gluing said intaglio plate onto a ceramic substrate by applying heat and  
14 pressure;

15 (f) separating said intaglio plate from said ceramic substrate to have a  
16 pattern of the electroconductive paste transferred onto the ceramic substrate, and  
17 burning it so as to form said first conductive pattern on the ceramic substrate;

18 (g) forming an insulation layer on said first conductive pattern, wherein said  
19 insulation layer is formed by a printing technology covering the whole area of said  
20 first conductive pattern, and is dried, said via is exposed through abrasion or  
21 grinding of the dried ~~skin of said insulation layer before burning~~ and said insulation  
22 layer is burned after the exposure of said via;

23 (h) forming a second conductive pattern on said insulation layer.

Claims 1, 2, and 4-21 have been cancelled.

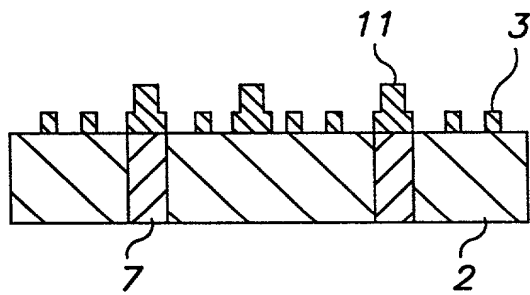


FIG. 10(a)

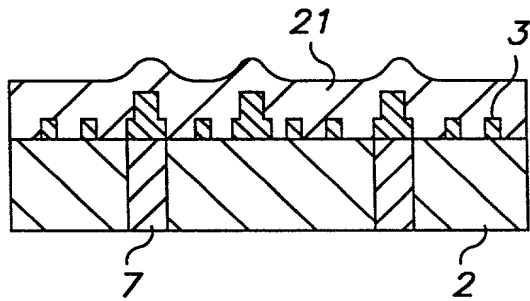


FIG. 10(b)

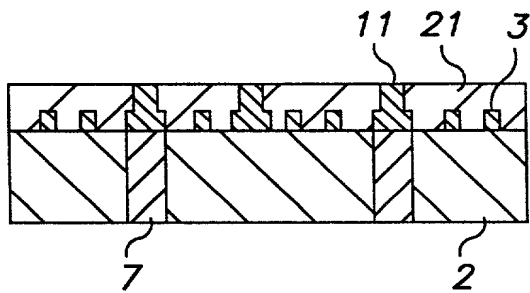


FIG. 10(c)

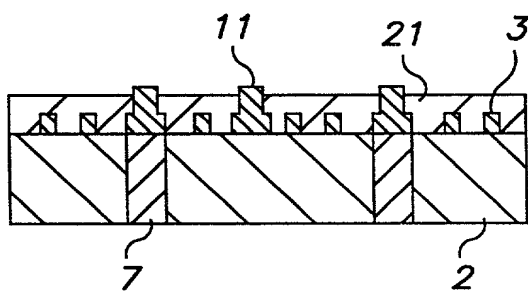


FIG. 10(d)

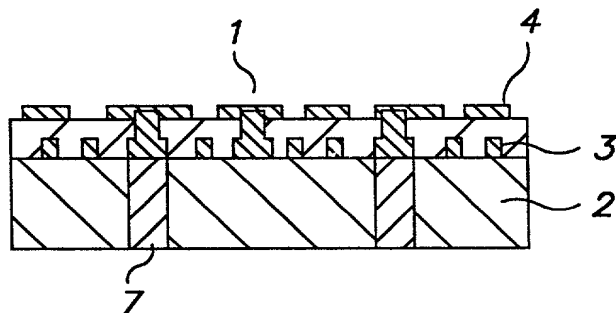


FIG. 10(e)

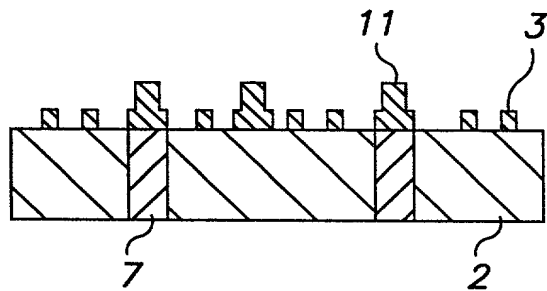


FIG. 11(a)

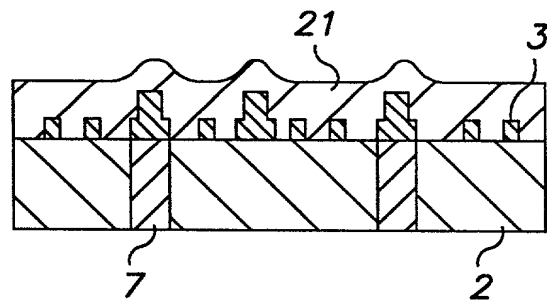


FIG. 11(b)

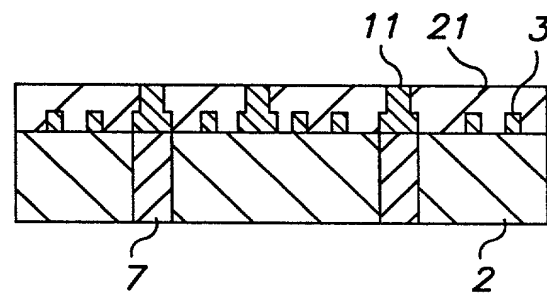


FIG. 11(c)

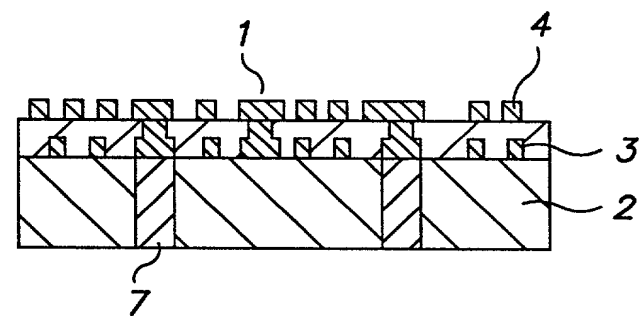


FIG. 11(d)

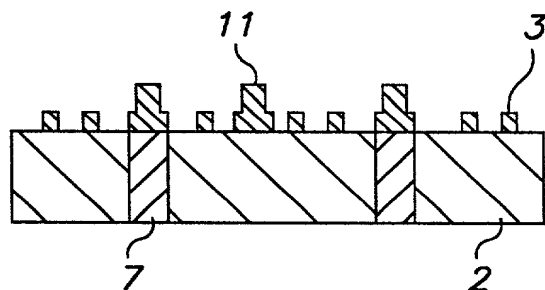


FIG. 12(a)

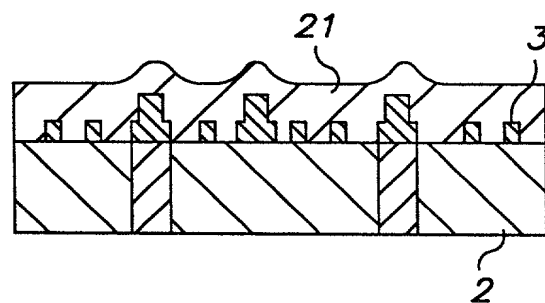


FIG. 12(b)

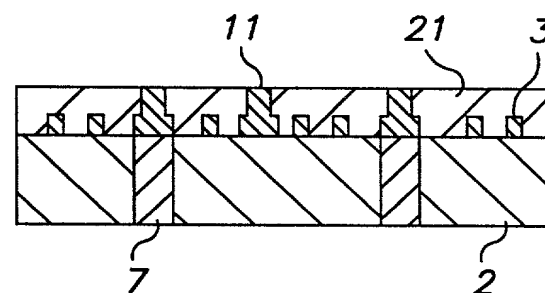


FIG. 12(c)

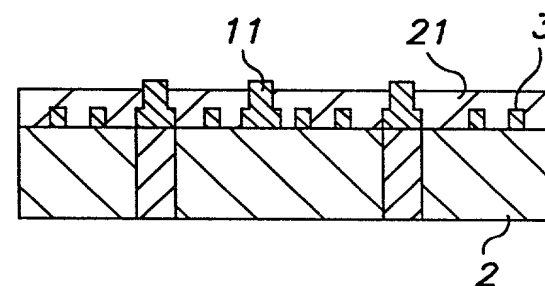


FIG. 12(d)

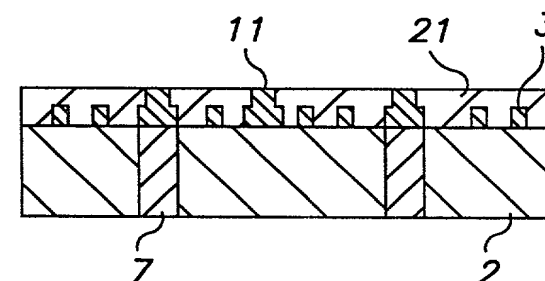


FIG. 12(e)

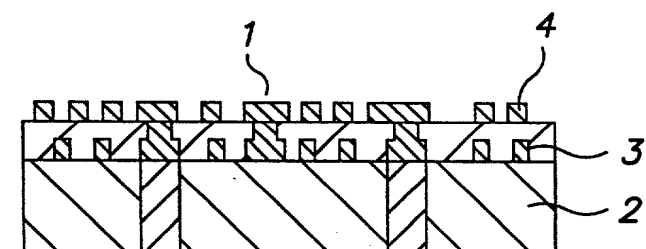


FIG. 12(f)